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A discussion of research in the area of retardation influenced by recent developments in psycholinguistics, the problem of language assessment, and the problem of language training, first considers a review by D.R. Olson on language, the concept of transformational grammar, syntactic structure of sentences, the acquisition of linguistic meaning, and the interaction between innate biological factors and environmental influences. Studies on the language of the retarded are cited which indicate a connection between motor or chronological development and language development and which imply that language development in the retarded is slower rather than qualitatively different from that of normal children. Criticism is directed toward the Illinois Test of Psycholinguistic Abilities and the Peabody Language Development Kit on the grounds that neither is based on a viable model of linguistic competence and performance and that neither reflect recent work in the area of developmental psycholinguistics. Minimal requirements for a language assessment device are outlined in transformational terms as are hypotheses for research in language training. (RP)

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PROBLEMS OF LANGUAGE DEVELOPMENT IN THE RETARDED: A DISCUSSION OF OLSON'S REVIEW[1,2]

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The present chapter consists not only of a discussion of Olson's review but of a discussion of some of the research in the area of retardation that has been influenced by recent developments in psycholinguistics, the problem of language assessment, and the problem of language training or intervention.

Olson's (1968) review of the voluminous literature on language and cognition displays a sharp awareness of the critical issues in contemporary psycholinguistics and cognitive psychology. Although he has not chosen to review the relevant research in the area of retardation, nor to explore the implications of work on normal linguistic and cognitive development for problems of retarded behavior, it should be eminently clear from his effort how useless it would be even to attempt to approach such problems as the measurement of language ability and language training of the retarded without a firm grounding in theory, methodology, and research findings in such basic fields as linguistics, psycholinguistics, and cognitive psychology.

Rather than limiting myself to a discussion of Olson's review, I would like to pick up where he left off and take this opportunity to discuss, within the present limitations of time and space, (a) some of the research in the area of retardation that has been influenced by recent developments in psycholinguistics, (b) the problem of language assessment, and (c) the problem of language training or intervention. My remarks are limited almost entirely to the area of language functioning, since it is this area that commands most of my attention at present. In other words, the emphasis which I have placed here upon language behavior is a result of chance rather than principle.

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Comments on the Review

On most points, I find myself in general agreement with Olson. It should be clear from his review that traditional behavioristic views are

inadequate to handle most of the interesting questions concerning linguistic and cognitive development. More promising is what many have called the information processing view, with its emphasis on the acquisition of abstract skills rather than specific responses, on the organism's active control and organization of sensory input in perception, on the importance of input organization for efficient storage and retrieval, and on the rule-governed nature of linguistic, problem solving and conceptual activity. Olson's review reflects the fact that we are passing from an era in which the major emphasis in the study of language and cognition has been upon reproductive processes to one in which the emphasis is upon creative, constructive production. Some of the specific points made in Olson's review are of enough general importance to warrant repetition, with some additional comments.

1. An adequate characterization of what is acquired when a child acquires a language is essential to an understanding of language development. At present, the sole contender in this domain appears to be Chomsky's transformational grammar. The only other alternative open to the psychologist would be to attempt to construct a grammar from S-R associative theory and the results of traditional research in verbal behavior. The difficulties of such an approach have been pointed out in many publications (e.g., McNeill, 1968) and need not concern us here. It is important to recognize, however, that transformational theory is by no means complete. There remain many fundamental questions still to be answered in the areas of phonology, syntax, and semantics. Some of these problems center around the treatment of discourse structures (intersentential relationships) and ellipses (incomplete sentences). Progress along these lines, I believe, has been hampered by the tendency of most linguists and psycholinguists to treat the sentence as the highest-level unit in language, a tendency which is evident in Olson's review.

It should also be mentioned in this context that there is at present no adequate theory of linguistic performance available to the student of language behavior. The precise manner in which the language user utilizes the implicit linguistic knowledge or competence represented (in an idealized fashion) by transformational grammar in the production and understanding of language is still largely unknown.

2. Although our ignorance runs deep in the areas of linguistic performance, it should not be difficult for those of you who have had little contact with recent developments in psycholinguistics to appreciate, from Olson's

review, something of the abstract, hierarchically organized, rule-governed and essentially creative character of language functioning.

3. In order to understand a sentence, the language user must in some manner recover its underlying syntactic structure. It is this principle that Olson has in mind when he attempts at the start of his paper to impress us with the role of abstract grammatical categories and relations in sentence understanding. What is important here is that we realize that whereas the meaning of individual words is arbitrary, the meaning of a sentence is not; its meaning is determined by rule.

4. Cognitive development can be considered from the perspective of language. One of the facts that make this perspective feasible is, of course the realization that much of what underlies cognitive behavior can be characterized as abstract and rule-governed. Olson's review and discussions such as those of Chomsky (1968) should contribute materially to the development of this approach.

5. It is of only limited value to consider meaning primarily in terms of reference; a consideration of the acquisition of linguistic meaning (i.e., meaning reflected in linguistic interrelations) appears to be essential to an understanding of semantic development. From the material reviewed by Olson and others (e.g., McNeill, in press), it appears that the development of the semantic system of a language involves at least (a) acquisition of the semantic features (categories) assigned to words by the adult language, (b) acquisition of the contextual features of words (e.g., chased the cat would represent a contextual feature of dog), (c) acquisition of the dictionary (verbal) definitions of words, and (d) acquisition of the rules for combining the meanings of words in sentences into the meanings of higher-order constituents and ultimately into single meanings for the entire strings.

6. Language development is the result of an interaction between innate biological factors and environmental influences. Olson reviews some of the considerations that bear upon this view. In recent years psycholinguists have begun to place more emphasis upon innate biological factors and less upon the role of the environment in language development. Chomsky (1965; 1968), McNeill (1966b; in press) and Lenneberg (1967) have been largely responsible for the development of the biological view. I have attempted elsewhere (Rosenberg, 1968) to characterize it in terms of a number of properties;

because of the obvious theoretical and practical significance of the biological view to the central problem of the conference we are attending, it might be useful to summarize this characterization here.

Briefly, the process of language acquisition was seen to include a number of components: (a) a general cognitive component (an innate ability to categorize perceived similarities); (b) a specific cognitive component (an innate ability to organize linguistic input in terms of such universal features of grammar as syntactic classes and fundamental grammatical relations); (c) a specific receptor-effector component (auditory-vocal); (d) a motivational component that manifests itself in the active participation that characterizes the child's acquisition of language; (e) an environmental component (a corpus of adult language utterances) which serves to activate the innate language acquisition system and which the child utilizes as the raw material for constructing the adult language; and (f) a maturational component (critical developmental period). I suggested further in the original paper that "the theory implies that disorders of language development are likely to be associated with conditions that lead to disturbances of any one (or any combination) of these components (p. 296)." It is not difficult to see how the biological view would relate to the language development of retarded and culturally disadvantaged children.

Studies on the Language of the Retarded

An examination of those reviews of research on the language of the retarded (e.g., McCarthy, 1964) that have appeared in the last few years indicates that work in this area reflects only to a very limited extent important developments in the fields of linguistics and psycholinguistics. A few studies have appeared recently, however, which do represent a departure from this trend. The most important and probably the most comprehensive of them is a study by Lenneberg, Nichols and Rosenberger (1964) which examined over a period of 3 years the language development of mongoloid children ranging in age from 3 to 22 years. These were children who had been raised by their parents and were living at home. The lowest IQ's in this sample were in the 20's and the highest were in the 70's. The measures used included (a) medical history, (b) neurological examination, (c) psychological testing, (d) taping of spontaneous speech, (e) an articulation test, (f) a sentence-repetition test, (g) a vocabulary test, and other measures of linguistic

behavior. The major findings are:(a) IQ does not predict stage of language development (i.e., babbling, words, phrases, sentences) but CA does; (b)"there is a significant relationship between motor development and onset of language (p. 122)"; (c) although clearly slowed, language development in mongoloid children is similar to what it is in normal children; (d) some mongoloid children are able to process sentences with rather complex syntactic structure. From observations (a) and (b) these investigators concluded that "advance in language is more closely controlled by maturational factors than by intellectual ability" (p. 136). Equally important is the conclusion that the language of mongoloid children reflects the mastery of abstract rules and concepts. And even with regard to the first conclusion--although the study did not supply relevant data--intellectual ability would certainly play a role in those aspects of language development (i.e., transformations and semantics) which involve learning (McNeill, in press.)

One of the major studies in the history of research on normal language acquisition is Berko's (1958) on the development of the English morphological system in children from 4 to 7. This study is important not only for its substantive contribution but also for its methodological one to the problem of measuring grammatical knowledge. Lovell and Bradbury (1967) employed Berko's technique in a study of morphological development in English educationally subnormal (ESN) special-school children between 8 and 15 years old. Some of the findings of this investigation are:(a) IQ correlates significantly with the ability to inflect nonsense words (.42); (b) on "many of the aspects of morphology that have been studied, ESN special-school children, even when approaching school leaving age, do less well than Berko's first graders" (p. 614.); (c) ESN "children made relatively little progress in inflecting either lexicon or nonsense words during school years" (p. 614). The relationship observed here between IQ and inflection of nonsense words, and the slight progress shown in inflecting lexicon and nonsense words with increase in CA offer some support for the view which assigns a role to learning (in the present instance learning ability) in transformational development.

In another investigation, Lovell and Dixon (1967) studied grammatical development in ESN special-school children as it is reflected in imitation, comprehension and production. The investigation was inspired by the results of a study by Fraser, Bellugi and Brown (1963) of normal 3-year-old children in which it was observed that performance on an imitation task was superior

to performance on a comprehension task, which was in turn superior to performance on a production task. Lovell and Dixon included in their study normal children with ages from 2 through 6 years and ESN special-school children aged 6 (mean IQ = 61.1) and 7 (mean IQ = 66.5). The task given the Ss was designed to test their knowledge of ten grammatical contrasts (e.g., mass noun - count noun, present progressive tense - future tense, subject - object in the active voice, indirect object - direct object). In the imitation task the Ss were required to imitate utterances spoken by the experimenter, while the comprehension and production tasks involved, respectively, pointing to pictures which corresponded to spoken utterances and producing utterances to describe the contents of pictures.

Although one can entertain serious doubts about the statistical analysis of the data from this study, the results support those of Fraser, Bellugi and Brown (1963). As Lovell and Dixon put it, "In all age levels, and in both categories of children, imitation is more advanced than comprehension, and comprehension is more advanced than production" (p. 39). Performance on all three measures improved with age for both the normal and the retarded children. However, the performance of the 6-year-old normal children was superior to the performance of both the 7-year-old and the 8-year-old retarded children. The performance of the 6-year-old retarded children was similar to the performance of the 3-year-old normals, while the 7-year-old retarded children's performance resembled that of the 4-year-old normal children.

Here again, we have additional evidence for the view that language development in the retarded is slower rather than qualitatively different from that of normal children. A detailed discussion of the performance factors that might be responsible for the imitation - comprehension - production differences that have been observed can be found in McNeill (1966b).

For a number of years now psycholinguists have been aware that word associations reflect much more than simple word-to-word relationships, and that they can be understood only with reference to the syntactic and semantic system of the language (Clifton, 1967). What were once thought to be relationships explicable in terms of the classical laws of association are now considered to be the result of complex syntactic-semantic interactions (McNeill, 1963; 1966a). One thing that has characterized the development of associations (as revealed by free association norms) in normal children is the increase in the number of responses that fall in the same grammatical class as the stimulus.

Such responses are generally referred to as paradigmatic, while those that fall in other classes are termed syntagmatic.

If the development of language is slowed down in the retarded, as Lenneberg, Nichols and Rosenberger (1964) and others have suggested, then this lag should be manifested in the grammatical structure of their word associations. My colleague Melvyn Semmel and his associates (Semmel et al., (1968), have pursued this problem in a study in which the associative behavior of institutionalized and non-institutionalized retarded children was compared with that of normal CA and MA controls. The results of this study indicated, among other things, clear-cut superiority for the CA-normal Ss on paradigmatic responding.

Language Assessment

An examination of the literature on the measurement of linguistic maturity of the retarded provides a devastating picture of loss of contact with the main stream of research and theory in the language sciences. Kirk and McCarthy's (Kirk & McCarthy, 1961; McCarthy & Kirk, 1961; 1963) Illinois Test of Psycholinguistic Abilities (ITPA) is a case in point. For one thing, it is not based upon a viable model of linguistic competence and performance, and for another, it does not appear to reflect in any obvious way recent work in the area of developmental psycholinguistics. Some of its problems are discussed in an article by Weener, Barritt and Semmel (1967) which is accompanied by a response from McCarthy and a reply to McCarthy's response by Weener, Barritt and Semmel. A revision of the ITPA is supposed to be underway. One can only hope that it will reflect the changes that have taken place in our thinking about language and language behavior in the last decade. The authors of the ITPA certainly are aware that the theory (i.e., Osgood's) on which the instrument is based has been modified recently (Osgood, 1968) in the direction of the transformational point of view.

We can improve upon what has been done in the past to measure linguistic maturity; let me outline in transformational terms what I believe to be the minimal requirements for a language assessment device. It will be understood, I am sure, that my remarks are meant to be only a first step toward resolving this problem. It will also be evident from this discussion that I have not dealt with any of the technical problems of test construction.

Minimal Requirements for a Language Assessment Device

1. Such a device must be based upon an adequate characterization of the structure of the adult language. At present the only serious claimant

for this role is transformational grammar. The important distinctions emphasized by this point of view are (a) competence and performance, (b) phonological, syntactic, and semantic rules, (c) deep structure, surface structure, and transformations, and (d) phrase structure rules and lexicon. To this list, however, should be added some characterization of discourse rules. An important feature of this view is the assumption that the same competence (linguistic knowledge) underlies sentence understanding and sentence production.

2. The device must reflect our knowledge of normal language development. Here the reviews of Olson, McNeill (1966b; in press), and Griffin (1968) on the syntax of older children are invaluable.

3. It must be able to differentiate between underlying linguistic competence and observable linguistic performance as it is constrained by such factors as memory, attention, time limitations, and motivation. Given the current state of our knowledge of linguistic performance, perhaps the most fruitful approach initially would be to minimize the effects of nonlinguistic performance factors and depend upon other assessments (e.g., audiometric test, immediate memory span, clinical evaluation of emotional - motivational state) to provide information on variables that may be affecting the child's ability to utilize his linguistic competence. For example, the use of a perceptual choice task with no time constraints rather than a recall task for testing sentence comprehension would minimize the importance of short-term memory capacity for performance. However, though we might want to eliminate or minimize performance constraints, research strongly suggests that we should sample linguistic output in at least three domains--imitation, comprehension, and production.

4. Scoring will have to reflect idiosyncrasies of dialect. Some of the difficulties associated with this problem have been discussed by Cazden (1966).

5. Items should be grouped for scoring to reflect primarily either <u>maturational</u> development (e.g., the acquisition of sentential behavior <u>per se</u>) or learning (transformational and semantic development).

6. The items should reflect the full range of linguistic competence, phonological, syntactic, and semantic. For example, in assessing syntactic competence, one would want to obtain information on at least the following:

1. morphological rules (e.g., inflections, derivations),
2. grammatical categories (content and function words),

3. basic sentence types,
4. fundamental grammatical relations (subject, predicate, object, verb, modifier, head,)
5. structural equivalence (substitutability of words, phrases, and complete sentences in sentential positions dominated for example by noun phrase),
6. transformations (singular and insertion types),
7. discourse structures (e.g., pronominalizations, sentence connectors, sentence modifiers).

An assessment of semantic competence should include measures of

1. the lexicon (e.g., size, semantic featural maturity, contextual featural maturity, conceptual level of definitions, number of different definitions of a word that are known),
2. paraphrasing,
3. the ability to detect ambiguities,
4. sentence understanding,
5. production of sentences using novel semantic input.

If the effort to develop a language assessment device is successful, it should be possible to produce a profile which would permit us to identify a child's linguistic maturity with respect to

Level of linguistic functioning

1. word
2. phrase
3. simple sentence
4. complex sentence (embedding)
5. connected discourse

Competence

1. syntactic
2. semantic
3. phonological

Performance modes

1. imitation
2. comprehension
3. production

Cognitive modes

1. maturational
   a. phonological
   b. deep syntactic
2. experiential
   a. transformational

b. surface syntactic

c. semantic.

As to what specific measures might be used in such a device, an examination of the psycholinguistic literature suggests a number of possibilities. These include (a) Berko's (1958) test of morphological competence, (b) Brown and Berko's (1960) test of the ability to identify the grammatical class of nonsense words from contextual usage, (c) the use of imitation (Slobin & Welsh, 1967) to reveal significant features of the child's syntactic competence (the child does not simply imitate an adult utterance, he reformulates it in terms of his own grammar), (d) the use of pictorial materials to evaluate knowledge of grammatical contrasts in sentence comprehension and production (Fraser, Bellugi, & Brown, 1963), (e) phonological measures (Lenneberg, Nichols, & Rosenberger, 1964; Messer, 1967), (f) the use of the cloze procedure to assess knowledge of syntactic and semantic constraints in sentences (Semmel et al., 1967) and in connected discourse (Fillenbaum, Jones, & Rapoport, 1963), (g) measures (e.g., grammatical class distributions, basic sentence types, insertion transformations, grammatical errors) derived from samples of free speech (e.g., Fillenbaum, Jones,& Wepman, 1961), and (h) the use of free and controlled word association norms and techniques to assess semantic featural maturity (Brown & Berko, 1960; Semmel et al., 1968) and contextual featural maturity (Rosenberg & Koen, 1968).

Language Training

The situation as regards language training of the retarded is in many respects similar to that of language assessment. As an example of some of the problems one encounters here, I have selected a language training program developed at Peabody College, Dunn and Smith's (1965) Peabody Language Development Kit (PLDK). My reason for choosing this program was twofold. First, it has evidently achieved some popularity among teachers in the field, and second, it has been published in an explicit enough form to permit detailed comment. According to its authors, the PLDK.." should be especially effective with grade one disadvantaged children and with educable mentally retarded pupils in primary special classes" (p. 14). It is further maintained that "Kindergarten children who are intellectually average and above will find the lessons stimulating, as will slower pupils in any regular grade one class" (p. iv). The kit was ". . . designed to stimulate oral language and verbal intelligence, and therefore to enhance school progress" (p. vii).

I have limited my comments to the linguistic aspects of the program:

1. Like the ITPA, the PLDK is based on a model of psycholinguistic processes that has been demonstrated time and time again to be empirically and in principle incapable of characterizing human language functioning (especially the knowledge that underlies linguistic performance) as we know it. The model presented in the kit's manual consists of nothing more than a set of labeled boxes.

2. There is no attempt in the manual to indicate precisely how the language exercises it proposes are generated by the theory on which the kit is based.

3. According to the manual, the training program of the PLDK emphasizes "global oral language," rather than "selected psycholinguistic abilities," yet there is no attempt in the manual to characterize precisely what is meant by these terms. It is possible, however, that this terminology does represent some kind of primitive distinction between competence and performance; but if so, it is most unlikely that "global oral language" retardation that reflects a competence deficit can be overcome except through the development of "selected psycholinguistic abilities."

4. There is no sign of an awareness of recent major advances in developmental psycholinguistics, especially those that relate to the biological theory of language acquisition.

5. The investigators are clearly committed to the assumption that language behavior is wholly learned and does not differ in any fundamental way from other forms of learned behavior. Such an assumption is highly questionable, on any reading of theory and research in the area of first-language acquisition.

6. The kit does not appear to be based upon a firm program of research on the language behavior of disadvantaged and educable mentally retarded children.

7. One of the claims made for the kit in the manual is that it is ". . . based on theory and research related to verbal learning. . ." (p. xvi), but there is no serious attempt to show the reader how these sources were used. In addition, the reference given to verbal learning theory and research, i.e., the review by McGeoch and Irion (1952), is clearly out of date.

8. Given the rather ambitious purpose of the kit (as outlined in the manual), namely "(a) to stimulate the overall oral language facility of the disadvantaged and retarded, (b) to develop their verbal intelligence through

training, and therefore, (c) to enhance their school progress" (p. xv), the research on which the kit is based appears inadequate.

9. The data available on the results achieved with an experimental version of the kit do not justify the enthusiasm expressed in the manual for its usefulness. What is more, when the authors conclude that "It remains for future research to test the effectiveness of the refined version of the kit. . ." (p. xx), we have to raise serious doubts about the scientific and practical wisdom of publishing a program whose effectiveness remains to be determined.

By way of contrast, we can outline some of the implications of the transformational-biological point of view and of research on normal language development for problems of language training. These suggestions must naturally not be considered as prescriptions for practice but as hypotheses for research.

1. Language training should be preceded by an adequate assessment of the nature of the language disabilities of the child. In this regard a critical first step would have to be a determination whether the disabilities reflect disorders of competence, disorders resulting from nonlinguistic performance deficits, or both.

2. The program should recognize the minimal contribution of the traditionally cited environmental variables (e.g., reinforcement, practice) to first-language acquisition (McNeill, 1966b; in press). Of course we should recognize that though traditional environmental variables are not involved in the acquisition of first-language competence, principles of behavioral modification may make an important contribution to the alleviation of some conditions affecting linguistic performance (see, for example, the work of Goldiamond, 1965).

3. A language training program should reflect the likelihood that experience is related more to transformational and semantic development than to deep syntactic and phonological development. However, as research reviewed earlier has suggested, the retarded child's IQ may limit his ability to achieve normal linguistic competence in those areas of language development where the contribution of learning is greatest.

4. A language training program should be based upon knowledge of the specific nature of the interaction between the speech of the child and the speech of the adult. Although the results are ambiguous, an excellent example of what can be done in this regard is to be found in a dissertation by Cazden (1965), in which an attempt was made

to determine the effects of two classes of interaction, expansion and modeling.

5. The program should consider carefully the implications arising from the possibility that there is a critical period for the operation of the innate biological component of first-language acquisition. Although we will no doubt continue to search for effective means of overcoming language deficits, we have to recognize that training in later years may not be able fully to compensate for the failure of the child to acquire some features of language competence during that period in its development when it normally acquires them. An interesting discussion of this problem in regard to language training for the deaf can be found in a recent article by Blanton (1968).

6. Since active participation appears to be characteristic of the behavior of a normal child acquiring a first language (Weir, 1962), it seems reasonable to suggest that a language training program for a child with retarded language development should include an attempt to insure active participation. How this might be accomplished is a matter for future research to settle.

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Footnotes

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[2]This article reproduces a talk delivered at the Peabody-NIMH Conference on Social-Cultural Aspects of Mental Retardation, Nashville, Tennessee, June, 1968.